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Revision 2

Field Sampling Plan for the Accelerated Retrieval Project for a Described Area within Pit 4

Beth A. McIlwain

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Idaho Completion Project

Bechtel BWXT Idaho, LLC

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Idaho Completion Project
Idaho Falls, Idaho 83415

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ABSTRACT

The purpose of the Accelerated Retrieval Project is to demonstrate a simplified retrieval system for removal of transuranic waste at the Subsurface Disposal Area. This field sampling plan describes how and where samples will be collected during waste retrieval operations to support determination of the (1) transuranic activity and physical description of the materials, which would have otherwise not been retrieved, that affect visual criteria for future decisions; (2) concentration of volatile organic compounds and potentially mobile radiological contaminants of concern in the underburden; and (3) whether the excavated waste zone material should be regulated under the Toxic Substances Control Act.

CONTENTS

FIGURES

TABLES

ACRONYMS

ARP	Accelerated Retrieval Project
CCP	Central Characterization Project
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	contaminants of concern
DOE	U.S. Department of Energy
DPS	drum packaging station
DQO	data quality objective
EDF	engineering design file
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan
ID	identification
INEEL	Idaho National Engineering and Environmental Laboratory
MCP	management control procedure
NTCRA	non-time-critical removal action
NTW	nontargeted waste
OU	operable unit
PPE	personal protective equipment
QAPjP	quality assurance project plan
QC	quality control
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RE	Retrieval Enclosure
RFP	Rocky Flats Plant
RI/FS	remedial investigation and feasibility study
RWMC	Radioactive Waste Management Complex

SAP	sampling and analysis plan
SDA	Subsurface Disposal Area
TRU	transuranic
TSCA	Toxic Substance Control Act
TW	targeted waste
VOC	volatile organic compound
WGS	Waste Generator Services
WIPP	Waste Isolation Pilot Plant
WZM	waste zone material

Field Sampling Plan for the Accelerated Retrieval Project for a Described Area within Pit 4

1. INTRODUCTION AND SITE BACKGROUND

The U.S. Department of Energy (DOE) Idaho Operations Office, with agreement from the U.S. Environmental Protection Agency (EPA) and Idaho Department of Environmental Quality, has selected a designated portion of Pit 4 for implementation of a non-time-critical removal action (NTCRA) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601 et seq., 1980) at the Idaho National Engineering and Environmental Laboratory (INEEL). The project is referred to as the Accelerated Retrieval Project (ARP).

The DOE has determined that the removal action shall, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action. Specifically, the proposed removal action, in addition to addressing a material portion of the hazardous substances in the Subsurface Disposal Area (SDA) at the INEEL, will provide characterization, and technical and cost information from full-scale waste retrieval activities that will support the remedial investigation and feasibility study (RI/FS) for Operable Unit (OU) 7-13/14. It also will establish process details for certification and transfer of formerly buried transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP) in New Mexico.

1.1 Objectives of the Sampling

This field sampling plan (FSP) describes the collection and analysis of samples needed to:

- Determine the TRU activity and capture a physical description of sampled materials which would have otherwise not been retrieved that affect visual criteria for future decisions

- Determine the concentration of volatile organic compounds (VOCs) and potentially mobile radiological OU 7-13/14 contaminants of concern (COCs) in the underburden

- Determine whether the excavated waste zone material (WZM) should be regulated under the Toxic Substances Control Act (TSCA) (15 USC § 2601 et seq., 1976).

The project facilities and processes are being designed to safely conduct a targeted retrieval of the following Rocky Flats Plant (RFP) waste streams: Series 741 and 743 sludge, graphite, filters, and roaster-oxide waste. The process comprises waste retrieval in a Retrieval Enclosure (RE), transfer of waste into containers at clean drum-packaging stations, assay of the waste containers after release from the RE, and interim storage in a storage enclosure located within the SDA or alternatively in WMF-628.

1.2 Scope of the Sampling Plan

The work described in this FSP will be used to:

- Verify and improve the visual segregation method for targeting certain RFP TRU waste forms

- Confirm the absence of potentially mobile radiological COCs in the underburden

- Determine the concentration of VOCs in the underburden

- Determine the appropriate TSCA classification of the excavated waste.

Together, this FSP and the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* (DOE-ID 2004a) are considered the sampling and analysis plan for the project. This FSP has been prepared in accordance with the Idaho Completion Project management control procedure, "Environmental Sampling Activities at the INEEL" (ICP-MCP-9439) and describes the field activities that are part of the investigation. The *Quality Assurance Project Plan* (QAPjP) (DOE-ID 2004a) describes the processes and programs that ensure the generated data will be suitable for the intended use.

1.3 Site Background

The INEEL is a DOE facility, located 52 km (32 mi) west of Idaho Falls, Idaho, that occupies 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Snake River Plain. The Radioactive Waste Management Complex (RWMC) is located in the southwestern portion of INEEL, as shown in Figure 1. The SDA is a 39-hectare (97-acre) area located within the RWMC. The SDA consists of 20 pits, 58 trenches, 21 soil vault rows, Pad A, and the Acid Pit where waste disposal activities occurred. Pit 4 is located in about the center of the SDA. The described area for retrieval is located in the eastern half of Pit 4.

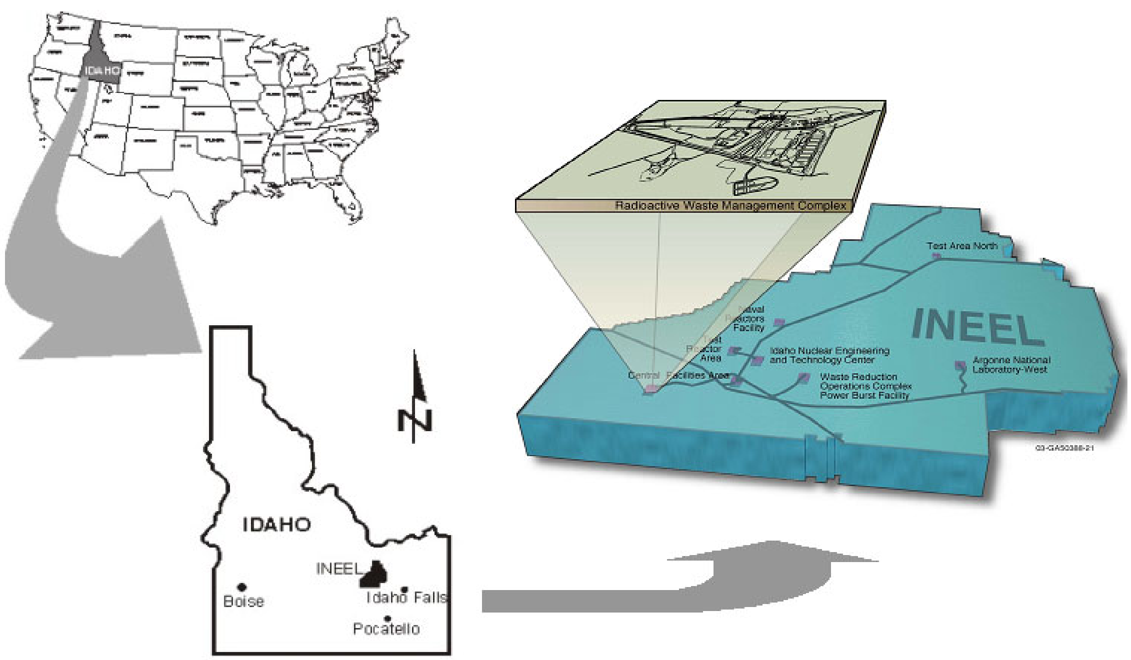

Figure 1. Map showing the location of the Radioactive Waste Management Complex at the Idaho National Engineering and Environmental Laboratory.

The selection of the described retrieval area within Pit 4 (see Figure 2) for the ARP was based on an evaluation of shipping and burial records of containerized radioactive materials and sludge from RFP and radioactive waste generated at INEEL. From these records, several 1/2-acre areas within the SDA that contain relatively large amounts of TRU or other contaminated waste were targeted.

The objective of the NTCRA is to perform a targeted retrieval of certain RFP waste streams that contain significant concentrations of the COCs identified in the OU 7-13/14 risk assessment

(Holdren et al. 2002). To achieve this objective, the NTCRA will focus on visual identification and removal of the following RFP waste streams: Series 741 and 743 sludge, graphite, filters, and roaster-oxide waste. Overall remediation of WAG 7 is being evaluated through a CERCLA RI/FS under OU 7-13/14. Ultimately, the RI/FS will lead to risk-management decisions and selection of a final comprehensive remedial approach through development of a CERCLA Record of Decision and follow-on remedial design and activities.

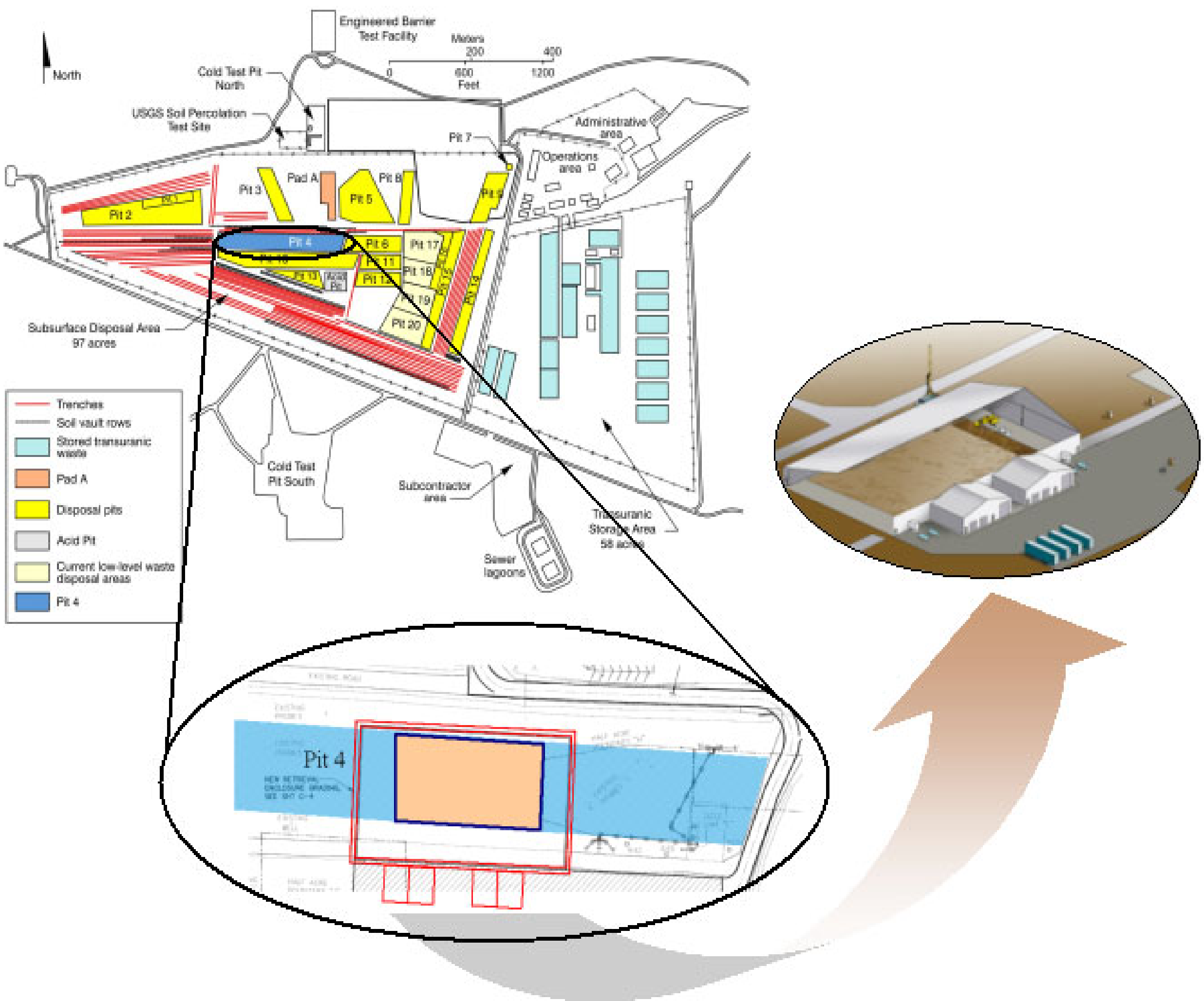

Figure 2. Map of the Subsurface Disposal Area showing location of the described area within Pit 4.

1.3.1 Background of Pit 4 within the Subsurface Disposal Area

Pit 4 was open to receive waste from January 1963 through September 1967. Based on the disposal practices at the time, containerized waste, primarily from RFP in Colorado, was initially stacked in the pit. In November 1963, this practice was changed, and containers were dumped into the pits rather than stacked to reduce labor costs and personnel exposures. Based on this operational change and the timeframe of disposal, it is expected that RFP waste within the designated retrieval area was dumped rather than stacked. Additional waste from INEEL waste generators and some waste from off-Site generators also were disposed of in the pit.

The disposal process in the 1960s involved excavating an area in the SDA, with tractor-drawn scrapers, to the outcroppings of the underlying basalt. This was followed by backfilling and leveling of the newly constructed pit floor with a layer of native soil ,approximately 0.6 m (2 ft) thick, on which the waste would be placed. Waste was contained in drums; cardboard, wood, and metal boxes; and other containers. After waste was emplaced, pits were backfilled and initially covered with about 1 m (3 ft) of soil, commonly referred to as overburden soil. The estimated overburden thickness in Pit 4 ranges from 1.2 to 2.1 m (4 to 7 ft). The additional soil thickness resulted from maintenance activities that added soil cover to the SDA in the 1970s and 1980s (Holdren et al. 2002; EG&G 1985). After approximately 40 years of burial, the original disposal containers, including the carbon steel drums, are expected to be significantly corroded and degraded similar to the drums removed in early 2004 as part of the OU 7-10 Glovebox Excavator Method Project activities.

The pits were excavated to various sizes. Pit 4, shown on Figure 2, is located in the approximate center of the SDA and shares a common eastern boundary with Pit 6. Pit 4 has a surface area of 9,948.2 m^2 (107,082 ft^2). The total volume of Pit 4 is estimated at 45,307 m^3 (1,600,000 ft^3) (Holdren et al. 2002). The retrieval area of focus comprises approximately 31% of the overall area of Pit 4 with approximate dimensions of 38.4 × 74.4 m (126 × 264 ft). As discussed in Section 1, the designated portion of Pit 4 was selected because it contains high concentrations of TRU waste and also contains significant volumes of other targeted waste (TW) forms, including VOCs and uranium. The approximate 1/2-acre size was selected based on the existing distribution of waste in the pit and other engineering factors (e.g., economies of scale associated with retrieval).

1.3.1.1 Estimated Waste Inventory in the Designated Retrieval Area of Pit 4 within the Subsurface Disposal Area. The OU 7-13/14 program has developed extensive information defining the waste inventories disposed of in the pits, trenches, and soil vault rows in the SDA. Disposal records and corresponding trailer load list information from RFP are the ultimate source for the available information for the disposal locations and waste type designations. The OU 7-13/14 programs have developed a number of databases and supporting geographical information system applications to document waste inventory type, quantity, and location information. Based on this information, an engineering design file (EDF) has been developed: EDF-4478, "Waste Inventory of Area G in Pit 4 for the Accelerated Retrieval Project within the Radioactive Waste Management Complex." This EDF summarizes the information on the volumes and types of waste buried in the designated portion of Pit 4. Table 1 provides a summary of information contained in the EDF.

Table 1. Rocky Flats Plant waste content in the designated retrieval area of Pit 4 within the Subsurface Disposal Area.

Waste Stream	Summary Characteristics	Packaging	Estimated Container Number
Series 741 first-stage sludge	Salt precipitate containing plutonium and americium oxides, depleted uranium, metal oxides, and organic constituents.	18.1 to 22.7 kg (40 to 50 lb) of Portland cement added to top and bottom of drum to absorb any free liquids. Two plastic bags.	886 drums
Series 742 second-stage sludge	Salt precipitate containing plutonium and americium oxides, metal oxides, and organic constituents.	18.1 to 22.7 kg (40 to 50 lb) of Portland cement added in layers to absorb any free liquids. Two plastic bags.	770 drums
Series 743 sludge organic setups	Organic liquid waste solidified using calcium silicate (pastelike or greaselike).	113.6 L (30 gal) of organic waste mixed with 45.4 kg (100 lb) calcium silicate. Small quantities (4.5 to 9.1 kg [10 to 20 lb]) of Oil-Dri added to top and bottom, if necessary. Two plastic bags.	634 drums

Table 1. (continued).

Waste Stream	Summary Characteristics	Packaging	Estimated Container Number
Series 744 sludge special setups	Complexing chemicals (liquids) including Versenes, organic acids, and alcohols solidified with cement.	86.2 kg (190 lb) of Portland cement and 22.7 kg (50 lb) of magnesia cement in drum followed by the addition of 99.9 L (26.4 gal) of liquid waste. Additional cement top and bottom. Two plastic bags.	81 drums
Combustible, noncombustible, and mixed debris	Solid radioactively contaminated combustible debris items such as paper, rags, cardboard, and wood. Noncombustible debris varies widely including pipe, empty drums, glass, and sand. Some waste is contaminated with beryllium metal.	Varies by process line generating the waste. Waste may have been wrapped in plastic or placed directly into the waste container.	5,024 drums, boxes, and dumpster loads
Roaster-oxide waste	Incinerated depleted uranium. Primary chemical form is uranium oxide with some metal possible.	Packaged in metal drums with inner plastic bag packaging.	109 drums
Graphite	Graphite mold pieces after excess plutonium removal. Molds are broken into large pieces before packaging. Graphite fines (e.g., scarfings) packaged in small bottles.	Drums lined with polyethylene bags and, most likely, a cardboard liner. Bottles of graphite fines were individually wrapped in plastic bags.	490 drums
Filters	Discarded high-efficiency particulate air filters.	Packaged in cardboard cartons and boxes depending on the timeframe of disposal.	681 boxes and cartons

The RFP waste forms contain various radiological and nonradiological contaminants. The material shipped to Pit 4 from RFP included plutonium and uranium isotopes. Plutonium isotopes included Pu-238, Pu-239, Pu-240, Pu-241, and Pu-242. Uranium isotopes (i.e., U-234, U-235, U-236, and U-238) were shipped to the RWMC in the form of depleted uranium oxides. Also included in the waste shipments were Am-241 and trace quantities of Np-237. The isotopes Am-241 and Np-237 are daughter products resulting from the radioactive decay of Pu-241. In addition to the Am-241 produced by the decay of the Pu-241, Am-241 removed from plutonium during processing at RFP also was disposed of in Pit 4. This extra Am-241 is a significant contributor to the total radioactivity located in Pit 4. A number of radionuclides (e.g., Co-60, Cs-137, Sr-90, Y-90, and Ba-137), primarily from INEEL waste generators, are also expected to be encountered in the ARP area. The non-RFP waste streams include radioactively contaminated sewage sludge and a number of combustible and noncombustible debris waste forms.

Both organic and inorganic chemicals are known to be in Pit 4. The primary organic chemicals known to be in Pit 4 include carbon tetrachloride, trichloroethene, 1,1,1-trichloroethane, tetrachloroethene, lubricating oils, Freon-113, alcohols, organic acids, and Versenes (ethylenediaminetetraacetic acid). Examples of inorganic chemicals known to be in the waste include hydrated iron, zirconium, beryllium, lead, sodium nitrate, potassium nitrate, cadmium, dichromates, potassium phosphate, potassium sulfate, silver, asbestos, and calcium silicate. Table 1 describes and summarizes the major waste streams located in the designated retrieval area from RFP. As the table shows, the major waste streams consist of containerized (e.g., boxes and drums) sludge, combustible and noncombustible debris, graphite materials, and discarded filter media.

Waste management activities will be based on information from the various inventory documents identified in the preceding paragraphs and additional acceptable knowledge documentation being prepared to support the NTCRA. In addition, analytical data collected during project activities will be used to determine appropriate management of primary waste streams.

Buried waste in Pit 4 contains TRU and low-level waste. The transuranic radionuclides in Pit 4 are believed to be primarily contained in the drummed sludge and other RFP waste (e.g., graphite). Waste definitions are provided below for purposes of clarification:

- **Transuranic radionuclides**—radionuclides with an atomic number greater than 92 (DOE Order 435.1).

- **Transuranic waste**—without regard to source or form, waste that is contaminated with alpha-emitting transuranic radionuclides (atomic number greater than 92) with half-lives greater than 20 years and concentrations greater than 100 nCi/g at the time of assay. The primary radionuclides associated with SDA RFP TRU waste are Pu-238, Pu-239, Pu-240, Pu-242, and Am-241.

- **Low-level waste**—waste that is not high-level radioactive waste, spent nuclear fuel, TRU waste, by-product material (as defined in Section 11e[2] of "Atomic Energy Act of 1954" [42 USC § 2011-2259, 1954]), or naturally occurring radioactive material (DOE Order 435.1).

1.4 Report Organization

Section 2 presents the sampling objectives and data quality objectives (DQOs). Section 3 describes the sample locations and frequency. Section 4 provides information about sample designation and associated requirements. Section 5 contains a description of sampling equipment and procedures. Section 6 describes sample handling and analysis, including sample labeling and custody requirements. Section 7 discusses management of waste generated from the sampling activities, and Section 8 contains the cited references.

2. SAMPLING AND DATA QUALITY OBJECTIVES

The DQOs to support project objectives are described in *Data Quality Objectives for the Accelerated Retrieval Project for a Described Area within Pit 4* (McIlwain 2004).

Data quality objectives are qualitative and quantitative statements derived from the first six steps of the EPA DQO process that:

- Clarify the study objective
- Define the most appropriate type of data to collect to meet project needs
- Determine the most appropriate conditions from which to collect the data
- Specify tolerable limits on decision errors that will be used as a basis for establishing the quantity and quality of data needed for decision-making.

The DQOs are discussed in context of the DQO process as defined by EPA guidance in EPA QA/G-4, "Guidance for the Data Quality Objectives Process" (EPA 1994). This process was developed by EPA to ensure the type, quantity, and quality of data used in decision-making is appropriate for the intended application.

The project-controlled sampling activities described herein are only a portion of the overall DQOs required for the project. The primary objective of this FSP is to collect samples to:

- Ensure safe and compliant storage of drums
- Measure the activity of nontargeted waste (NTW) that would remain in the pit, and
- Confirm the absence of certain potentially mobile OU 7-13/14 radiological COCs in the underburden
- Determine the concentration of VOCs in the underburden
- Determine the appropriate TSCA classification of the excavated waste.

The DQOs for the objectives pertinent to this FSP are presented in Table 2.

2.1 Quality Assurance Objectives for Measurement

The quality assurance objectives for measurement will meet or surpass the minimum requirements for data quality indicators established in the QAPjP (DOE-ID 2004a). The QAPjP provides minimum requirements for the following measurement quality indicators: precision, accuracy, representativeness, completeness, and comparability. Precision, accuracy, and completeness will be calculated in accordance with the QAPjP.

2.1.1 Precision

Precision is a measure of the reproducibility of measurements under a given set of conditions. In the field, precision is affected by sample collection procedures and the unknown and potentially extreme heterogeneity of the buried waste. Overall precision is estimated by the variability (i.e., standard

Table 2. Data quality objectives for sampling conducted under this field sampling plan.

Objective	Data Use	Measurement	Sampling Method	Analytical Method	Analytical Level	Required Detection Level	Comments and Rationale
Ensure safe and compliant storage of retrieved waste	Collect sufficient information to support safe and compliant storage per approved waste acceptance criteria for ARP stored waste and future disposition	1. Compatibility of hazardous materials 2. Volume in new package 3. Pu-239 FGE 4. Weight of container 5. Radiological dose rate requirements for container disposal 6. Hazardous waste determination 7. PCBs	1. NA 2. Visual at closure of container 3. Fissile material monitoring 4. NA 5. 100% container radiological survey 6. NA 7. Location-based random sampling	1. Acceptable Knowledge 2. Visual 3. Fissile material monitor 4. Weigh drum 5. Radiological survey 6. HWD will be made based on available process waste stream information 7. SW-846 Method 8082	Definitive, screening, health physics survey	1. NA 2. Nearest 1/8 drum 3. Monitor capability specification is for minimum detectable activity of 1 g Pu-239 FGE (using a 5-minute count time) 4. NA 5. Based on disposal facility requirements 6. NA 7. Per procedure	1. Acceptable knowledge is the inventory basis and documented evaluation of compatibility of a binary combination of chemicals 3. If drum assay results are >200 FGE, then special storage conditions are required 7. Thirty samples will be taken in the first 1/4 acre (i.e., Phase 1) to make the TSCA determination for drums that originate from that 1/4 acre. A separate, identical determination for the second 1/4 acre will also be made (i.e., Phase 2).

Table 2. (continued).

Objective	Data Use	Measurement	Sampling Method	Analytical Method	Analytical Level	Required Detection Level	Comments and Rationale
Provide data on material that stays in the pit (sampled materials that would have otherwise not been retrieved)	Verify efficiency of visual criteria for future decisions	1. Visual description 2. a. Transuranic activity (i.e., Ci) b. Pu-239 equivalent activity (i.e., PE-Ci) c. Pu-239 FGE d. Uranium isotopic masses (U-233, U-234, and U-238) e. Plutonium isotopic masses (Pu-238, Pu-239, Pu-240, and Pu-242) f. Am-241 mass g. Total fissile mass (U-233, U-235, and Pu-239) h. Nonfissile beta-gamma emitting radionuclides (Sr-90 and Cs-137)	1. Visual 2. 100% drum assay will provide TRU characterization	1. a. Detailed description of material b. Photograph of material 2. Nondestructive assay	Definitive, screening	1. NA 2. Per WIPP approved procedure (as achievable with current technology).	TRU determination is made of the drum contents by Central Characterization Project
Provide characterization data for VOCs and potentially mobile radiological OU 7-13/14 COCs in the underburden	Characterize underburden soil to evaluate release of VOCs and potentially mobile radiological OU 7-13/14 COCs	1. Technetium-99 2. Iodine-129 3. Carbon-14 4. Chlorine-36 5. Plutonium isotopes (Pu-239 and Pu-239/240) 6. Neptunium-237 7. Uranium isotopes (U-233/234, U-235/236, U-238) 8. VOCs	Approach involves collection of underburden soil from exposed underburden area using the excavator.	1. Liquid scintillation or equivalent counting method 2. Low energy photon spectrometry or equivalent counting method 3. Liquid scintillation or equivalent counting method 4. Liquid scintillation or equivalent counting method 5–7. Alpha spectroscopy 8. SW-846 Method 8260B	Definitive	1. 1 pCi/g in accordance with QAPjP[a] 2. 1 pCi/g in accordance with QAPjP[a] 3. 3 pCi/g in accordance with QAPjP[a] 4. 10 pCi/g 5–7. 0.05 pCi/g in accordance with QAPjP[a] 8. Per procedure	Based on project objectives, underburden is not excavated but is exposed to allow sampling for VOCs and potentially mobile radionuclide COCs

a. DOE-ID (2004)
ARP = Accelerated Retrieval Project
COCs = contaminants of concern
FGE = fissile gram equivalent
OU = operable unit
QAPjP = quality assurance project plan
PCB = polychlorinated biphenyl
TSCA = Toxic Substances Control Act
VOC = volatile organic compound
WIPP = Waste Isolation Pilot Plant

deviation) across all regular samples within a population. This value can then be used to calculate the upper confidence bounds of the applicable mean concentrations.

Overall precision (i.e., field and laboratory) evaluations can be supported by collecting duplicate samples. Laboratory precision will be based on the use of laboratory-generated duplicate samples or matrix spike and matrix spike duplicate samples. Evaluation of laboratory precision will be performed during the process of method data validation. No field duplicates will be collected for the NTW sampling. The NTW sample data statistics will provide a picture of the variability of the material activity remaining in the pit.

2.1.2 Accuracy

Accuracy is a measure of bias in a measurement system. Bias is the systematic or persistent distortion of a measurement process that causes errors in one direction. Laboratory accuracy is demonstrated using laboratory control samples, blind quality control (QC) samples, and matrix spikes. Evaluation of laboratory accuracy will be performed during the method data validation process. Sample preservation and handling, field contamination, and the sample size and matrix affect overall accuracy. The representativeness of the sample (discussed below) is also a factor in the overall accuracy of the result.

2.1.3 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which the sampling and analysis data accurately and precisely represent a characteristic of a population, the parameter variations at a sampling point, or an environmental condition. In addition, representativeness addresses the proper design of the sampling program. Confirming that random sampling was performed and a sufficient number of samples are collected to meet the required confidence level will satisfy the representativeness criterion for material that would have otherwise not been retrieved (not targeted). The Agencies agreed to measure the activity remaining in the pit using the following parameters to estimate the mean: 90% confidence level, 0.2 relative error, and a 1.0 coefficient of variation. During an Agency meeting held on July 19, 2004, it was agreed that 5–6 underburden samples would be sufficient to determine the presence of VOCs and confirm the absence of potentially mobile OU 7-13/14 radiological COCs in the underburden.

2.1.4 Detection Limits

Detection limits are specified for analysis of PCBs in WZM samples and constituents in underburden soil samples in the QAPjP. The detection requirements for the TRU assay of NTW are as specified, or defined, by the Central Characterization Project (CCP).

2.1.5 Completeness

Completeness is a measure of the quantity of usable data collected during an investigation. The QAPjP requires that an overall completeness goal of 90% be achieved for noncritical samples. If critical parameters or samples are identified, a 100% completeness goal is specified. Critical data points are those sample locations or parameters for which valid data must be obtained for the sampling event to be considered complete. The samples collected under this FSP will be considered noncritical with a completeness goal of 90%.

2.1.6 Comparability

Comparability is a qualitative characteristic that refers to the confidence with which one data set can be compared to another. The analytical procedures used for characterization are standard and will be comparable to those procedures historically followed by other programs.

2.2 Data Validation

Method data validation is the process whereby analytical data are reviewed against set criteria to ensure the results conform to the requirements of the analytical method and any other specified requirements.

All laboratory-generated analytical data for WZM and underburden samples will be reviewed for analytical method compliance and technical merit.

3. SAMPLE LOCATION AND FREQUENCY

Project sampling activities will focus on sample collection during waste retrieval as discussed in the following subsections.

3.1 Overview of Waste Excavation Process

To provide protection from the weather and control the spread of contamination, a Retrieval Enclosure (RE) with airlocks (see Figure 3) will cover the retrieval area during all retrieval operations.

The RE is a temporary, relocatable structure that will house excavation, packaging, sampling, package decontamination, and personnel and equipment ingress and egress activities. Two attached structures house airlock operations, including waste examination and packaging. Operators in personal protective equipment (PPE) will operate a Gradall XL-5200 excavator to retrieve material from a described area within Pit 4 (see Figure 2) into waste containers. The waste zone is expected to be approximately 3–4.3 m (10–14 ft) deep and the walls will be sloped to maintain an angle of repose of approximately 1:1 (i.e., 45 degrees). At the digface, the excavator will retrieve TW (e.g., graphite, filters, sludge, uranium, and commingled soil) and place the waste in a tray that has been fitted with a woven plastic liner. The targeted/nontargeted determination will be made by an individual assisting the excavator operator by way of closed-circuit television cameras at the digface and mounted on the excavator. Nontargeted waste (e.g., debris and soil) will remain within the excavation area. The trays of TW will be transported to a drum packaging station (DPS) by telehandler.

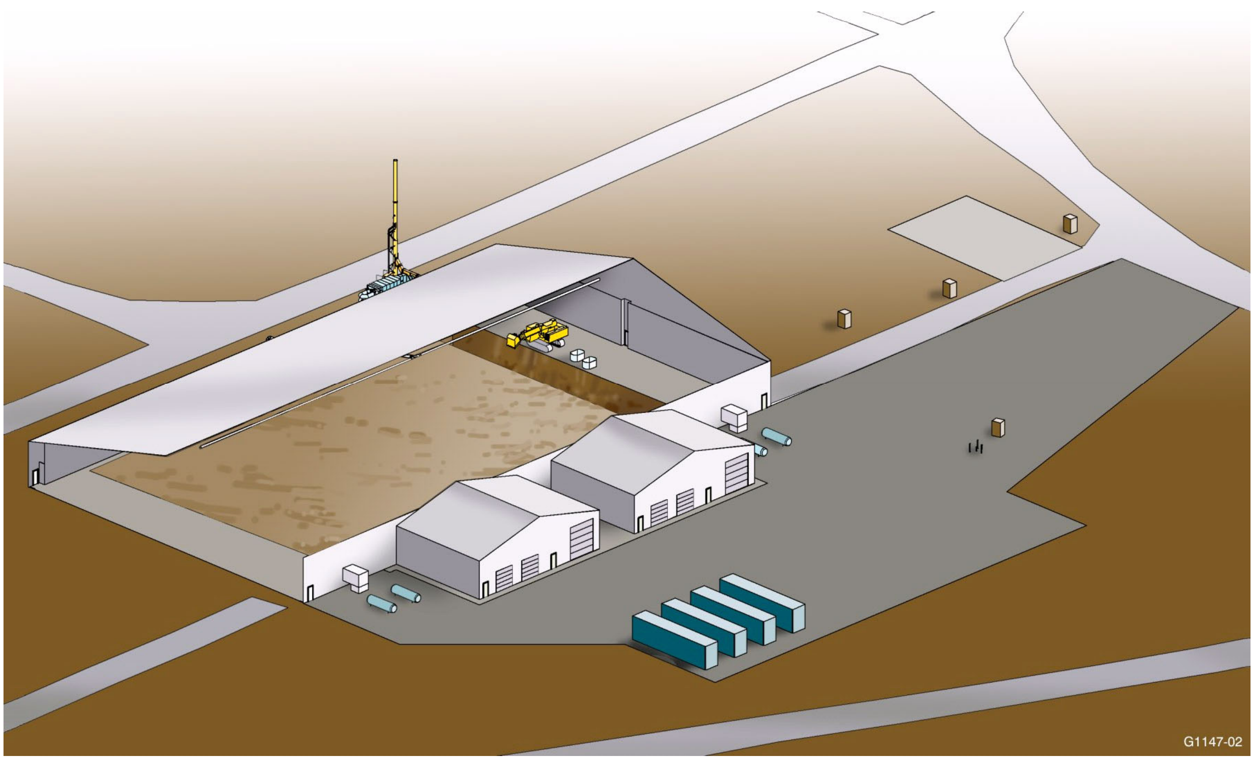

Figure 3. The Retrieval Enclosure will cover the retrieval area during operations.

The project plans a staged excavation campaign. The staged operation will segment the excavation site into an initial trench digging campaign and a moving trench campaign. The initial trench excavates and relocates approximately one-eighth of the total pit volume and is required to open a region within the pit for the second moving trench operation. The initial trench campaign stages NTW within the retrieval enclosure and removes TW from the pit. The moving trench campaign will transfer the NTW from the initial trench campaign into the pit, remove TW from the pit, and relocate NTW from the east face of the trench to the west face.

3.2 Sampling Location and Frequency

This section details the location and frequency of samples collected during ARP.

3.2.1 Sampling Nontargeted Waste

The sampling approach will be to collect 68 random samples of NTW material that would have otherwise not been retrieved. The random samples will be collected from the angle of repose following the return of NTW from the east face of the pit to the west face. A specially colored sampling tray liner will be used to indicate that the material is designated for sampling. The excavator operator will radio the grid and depth to the person responsible for data collection at the DPS.

The west and north walls of the RE are marked in approximately 4.6-m (15-ft) grid increments to subdivide the retrieval area. The grid markings on the west wall number 1 through 9 and the wall markings for the north wall are A through R. The shift manager will identify to the excavator operator the locations in the pit designated for NTW sample collection. The location will be specified using the grid markings on the north and west end walls of the RE and an associated depth. Sample depths will be specified based on dividing the waste zone into thirds (i.e., top [approximately 0–1.2 m {0–4 ft}], middle [approximately 1.2–2.5 m {4–8 ft}], and bottom [approximately 2.5–3.7+ {8–12+ ft}]). The excavator operator, therefore, will have a 4.6 × 4.6-m (15 × 15-ft) by approximately 1.2-m (4-ft) volume that is designated for sample collection (see Figure 4). To the extent practicable, the sample will be collected from the center of the designated sample location. Adjustments may be necessary because of physical limitations caused by the angle of repose. The timing of sample collection at a designated location is dependent on the penetration of the NTW angle of repose (i.e., slope on the west side of the open trench) into the applicable grid location. In other words, the sample can only be collected after there is NTW (on the west side of the trench) present in the designated sample location. The operations shift manager is responsible for monitoring the progress of NTW return activities and identifying the optimum timing for NTW sample collection.

To arrive at the required 68 samples, the area available to sample NTW was defined, and eligible grid locations were identified.

Grids Q and R (all depths) on the east side of the retrieval area were excluded because of the location of the emptied trench at the completion of excavation operations. Also at completion, NTW in Grid P will be present but is expected to only lie on the angle of repose. This condition is based on the estimated dimension of the west-east opening at the top of the trench (approximately 13.7 m [45 ft]). The real opening, however, may be larger or smaller depending on the actual depth of the waste zone. Additionally, eligible grid locations along the south side of the pit (Grid 9) were limited to the "top" depth location because only 6 linear ft (approximate) of the 38.4-m (126-ft) west dimension of the retrieval area falls within this grid. Therefore, only the top depth location would be available for collecting NTW samples.

A total of 400 eligible grid locations were identified. A random number generator was then used to pick the 68 sample locations from the 400 eligible locations.

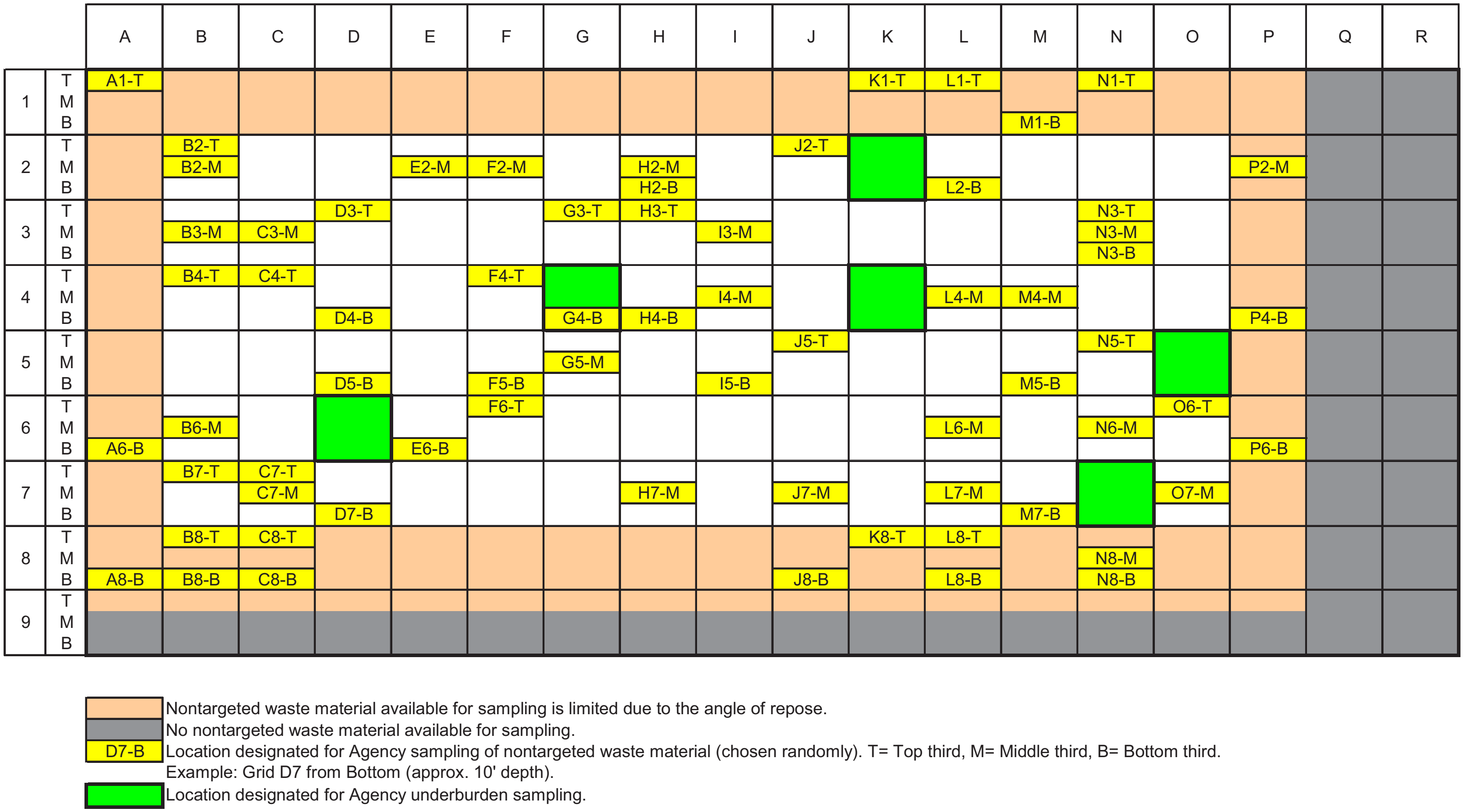

Figure 4. Nontargeted waste sample locations.

The grid markings from the north and west walls of the RE combined with the depth (top, middle, or bottom third) define the random location for each sample. The 68 random locations of the NTW samples are given in Table 3.

Table 3. Nontargeted waste sample locations.

Random Sample Number	North Wall Grid	West Wall Grid	Depth (location in angle of repose)
1	A	1	Top
2	A	6	Bottom
3	A	8	Bottom
4	B	2	Top
5	B	2	Middle
6	B	3	Middle
7	B	4	Middle
8	B	6	Middle
9	B	7	Top
10	B	8	Top
11	B	8	Bottom
12	C	3	Middle
13	C	4	Top
14	C	7	Top
15	C	7	Middle
16	C	8	Top
17	C	8	Bottom
18	D	3	Top
19	D	4	Bottom
20	D	5	Bottom
21	D	7	Bottom
22	E	2	Middle
23	E	6	Bottom
24	F	2	Middle
25	F	4	Top
26	F	5	Bottom
27	F	6	Top
28	G	3	Top
29	G	4	Bottom
30	G	5	Middle
31	H	2	Middle
32	H	2	Bottom
33	H	3	Top

Table 3. (continued).

Random Sample Number	North Wall Grid	West Wall Grid	Depth (location in angle of repose)
34	H	4	Bottom
35	H	7	Middle
36	I	3	Middle
37	I	4	Middle
38	I	5	Bottom
39	J	2	Top
40	J	5	Top
41	J	7	Middle
42	J	8	Bottom
43	K	1	Top
44	K	8	Top
45	L	1	Top
46	L	2	Bottom
47	L	4	Middle
48	L	6	Middle
49	L	7	Middle
50	L	8	Top
51	L	8	Bottom
52	M	1	Bottom
53	M	4	Middle
54	M	5	Bottom
55	M	7	Bottom
56	N	1	Top
57	N	3	Top
58	N	3	Middle
59	N	3	Bottom
60	N	5	Top
61	N	6	Middle
62	N	8	Middle
63	N	8	Bottom
64	O	6	Top
65	O	7	Middle
66	P	2	Middle
67	P	4	Bottom
68	P	6	Bottom

3.2.2 Sampling Underburden Soil

Swaths of underburden will be exposed during excavation. The excavator operator will perform random collection of six underburden samples.

The exposed area that would be available to sample underburden was defined using the excavation area dimensions and the angle of repose in the pit. This eliminated the outside border of the pit defined by the RE wall markings number 1 and 8/9 and the letters A and R. The area of available underburden that would be exposed during the retrieval was divided into 96 approximately 4.6-m (15-ft) square grids and six locations were selected using a random number generator. The random locations for underburden sample collection are given in Table 4. The random grid numbers are presented in ascending order rather than the order in which they were generated.

Table 4. Underburden sample locations.

Underburden Sample Number	Wall Marking Coordinates
1	D - 6
2	G - 4
3	K - 2
4	K - 4
5	N - 7
6	O - 5

3.2.3 Waste Zone Materials Sampling

Thirty samples will be taken in the first 1/4 acre (i.e., Phase 1) to make the TSCA determination for drums that originate from that 1/4 acre. A separate, identical determination for the second 1/4 acre will also be made (i.e., Phase 2). The waste zone in the described area is approximately 0.2 ha (1/2 acre) by 3.7 m (12 ft) deep. It is expected that the waste zone will not be homogeneous, but rather heterogeneous. The sampling approach considers this by addressing both spatial and temporal variability of the waste and is consistent with EPA SW-846 Chapter 9, “Sampling Plan.”

Temporal variability is inherently addressed because the waste will be considered as a process batch with the results applying to that batch. Spatial variability is addressed by using a constrained randomization scheme that forces an appropriate estimate of the variability across the waste zone. By stratifying the waste into three 1.2-m (4-ft) thick layers, vertical heterogeneity is included in the variability estimate. Constrained randomization means that an equal number of samples are taken randomly from each 1.2-m (4-ft) layer so that bias due to unequal sample sizes per layer is avoided. This is consistent with stratified random sampling discussed in SW-846 Chapter 9. Randomness of sampling at each layer also serves to protect against any type of horizontal bias, such as might occur with systematic or haphazard sampling at each layer.

Random sampling is accomplished by partitioning the defined area within each retrieval phase into 192 cubical volumes and randomly selecting volumes for sampling. This equates to three layers, approximately 1.2 m (4 ft) thick, with each layer containing 64 cubical volumes in each defined area. Thirty of the 192 cubical volumes in each defined area will be randomly selected with the constraint that each layer contains 10 randomly selected cubical volumes. The random selection for each layer is accomplished by listing the 64 cubical volumes in the first two columns of an Excel spreadsheet by a grid-numbering scheme. The third column contains random numbers using the rand() function. Then the three columns are sorted based on the column of random numbers. The first 10 rows in the sorted column of grid numbers then become the randomly selected cubical volumes for that layer. This is repeated for each layer.

The material to be sampled is the homogeneous solids and soil and gravel from the defined areas of Pit 4. Material will be retrieved from roughly the cubical volume and sampled at the packaging station. If a selected sample location turns out to be all debris, the preselected coordinates cannot be used for sampling, and a replacement location is necessary. The replacement strategy entails sampling the first acceptable waste form that is identified in the direction that excavation is proceeding. The replacement sample and associated x, y, z coordinates that are excavated will be documented.

Identification of the sampling locations begins at the northwest corner of the retrieval area at an elevation of 1,528 m (5,014 ft); RWMC Site-specific horizontal datum coordinates are documented in INEEL Drawing 628247 (official use only). The excavation slope will be at an approximately 45-degree angle. During recent preretrieval activities, waste was encountered at an elevation of 1,527 m (5,011 ft). Given this, the waste zone will begin at 1,527-m (5,011-ft) elevation. Therefore, the area to be included in the random sampling begins 1 m (3 ft) east and 1 m (3 ft) south of the Northing and Easting location identified in the northwest corner of Drawing 628247 (official use only). Figures 5–10 present the randomly selected cubical volumes for each of the three layers in Phase 1, respectively. Each layer is smaller than the previous layer due to the approximately 45-degree angle of repose. Tables 5–10 present the horizontal center of the randomly selected cubical volumes for each layer of Phase 1, respectively. The samples should be taken at the horizontal center of the cubical volume plus or minus 1 m (3 ft). Each layer is approximately 1.2 m (4 ft) thick, and the sample should be collected at the vertical center of the cubical volume plus or minus 0.6 m (2 ft). This would be at elevations 1,527, 1,526, and 1,524 m (5,009, 5,005, and 5,001 ft). If waste is encountered above the anticipated 1,527-m (5,011-ft) elevation; samples should still be collected at the defined elevations.

The above process to locate and collect WZM samples is already in place for the Pit 4 WIPP/Resource Conservation and Recovery Act (RCRA) (42 USC § 6901 et seq.) sampling campaign. Each WZM sample for PCB analysis should be collected from the same tray and quadrant as the WIPP/RCRA sample, but after the WIPP/RCRA sample has been removed.

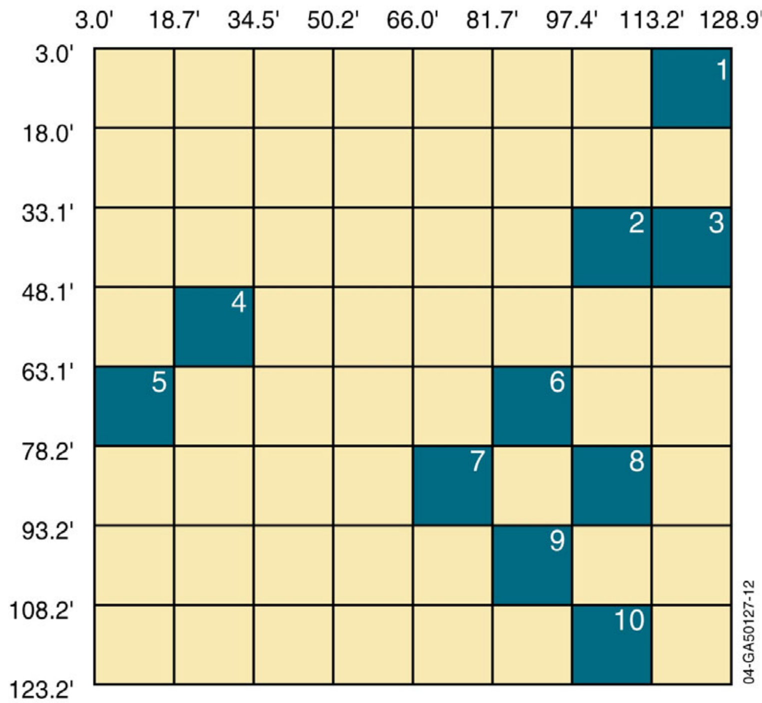

Figure 5. Random selection of cubical volumes for Phase 1, Layer 1 (0–4 ft) of the waste zone.

Table 5. Phase 1, Layer 1 grid center-points.

Random Sample	Feet in x-direction from Northwest Coordinate of Retrieval Area	Feet in y-direction from Northwest Coordinate of Retrieval Area
1	121.1	-10.5
2	105.3	-40.6
3	121.1	-40.6
4	26.6	-55.7
5	10.9	-70.7
6	89.6	-70.7
7	73.9	-85.7
8	105.3	-85.7
9	89.6	-100.7
10	105.3	-115.7

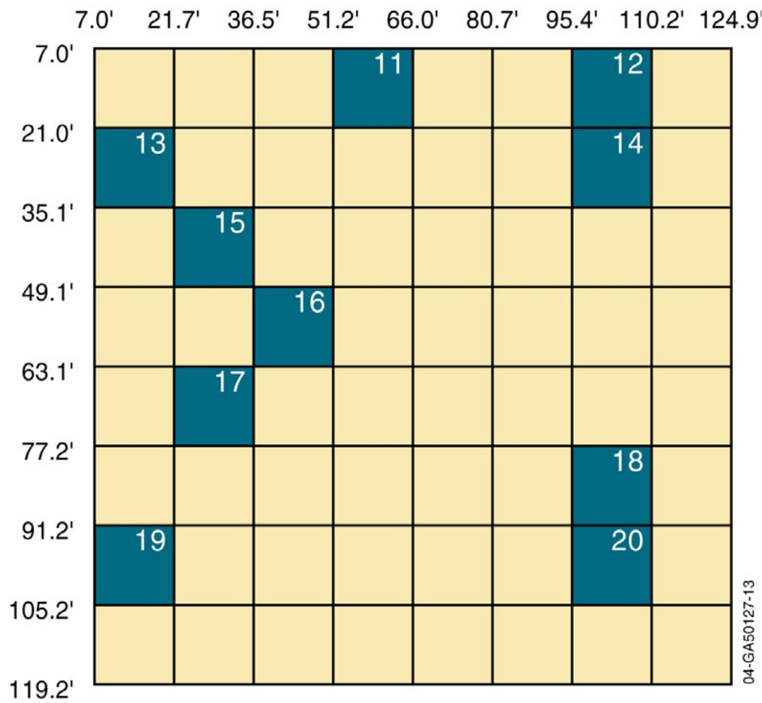

Figure 6. Random selection of cubical volumes for Phase 1, Layer 2 (4–8 ft) of the waste zone.

Table 6. Phase 1, Layer 2 grid center-points.

Random Sample	Feet in x-direction from Northwest Coordinate of Retrieval Area	Feet in y-direction from Northwest Coordinate of Retrieval Area
11	58.6	-14.0
12	102.8	-14.0
13	14.4	-28.1
14	102.8	-28.1
15	29.1	-42.1
16	43.9	-56.1
17	29.1	-70.2
18	102.8	-84.2
19	14.4	-98.2
20	102.8	-98.2

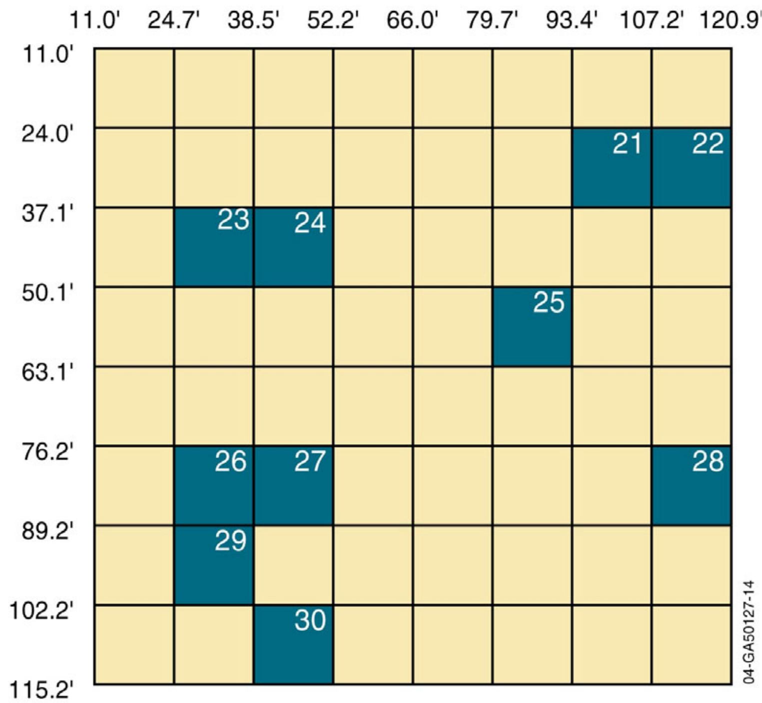

Figure 7. Random selection of cubical volumes for Phase 1, Layer 3 (8–12+ ft) of the waste zone.

Table 7. Phase 1, Layer 3 grid center-points.

Random Sample	Feet in x-direction from Northwest Coordinate of Retrieval Area	Feet in y-direction from Northwest Coordinate of Retrieval Area
21	100.3	-30.6
22	114.1	-30.6
23	31.6	-43.6
24	45.4	-43.6
25	86.6	-56.6
26	31.6	-82.7
27	45.4	-82.7
28	114.1	-82.7
29	31.6	-95.7
30	45.4	-108.7

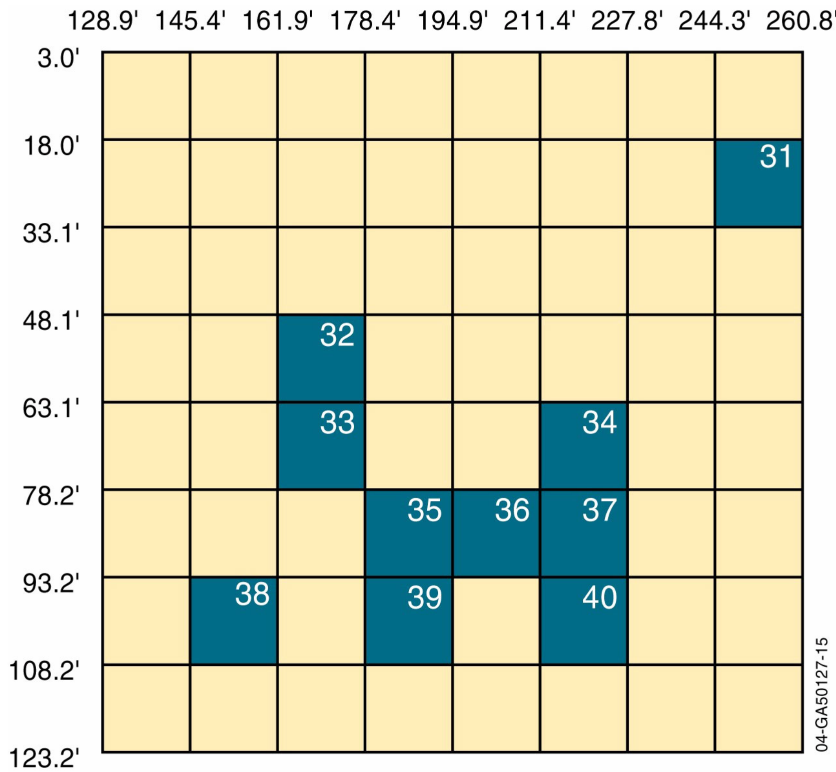

Figure 8. Random selection of cubical volumes for Phase 2, Layer 1 (0–4ft) of the waste zone.

Table 8. Phase 2, Layer 1 grid center-points.

Random Sample	Feet in x-direction from Northwest Coordinate of Retrieval Area	Feet in y-direction from Northwest Coordinate of Retrieval Area
31	252.6	-25.6
32	170.2	-55.6
33	170.2	-70.7
34	219.6	-70.7
35	186.7	-85.7
36	203.2	-85.7
37	219.6	-85.7
38	153.7	-100.7
39	186.7	-100.7
40	219.6	-100.7

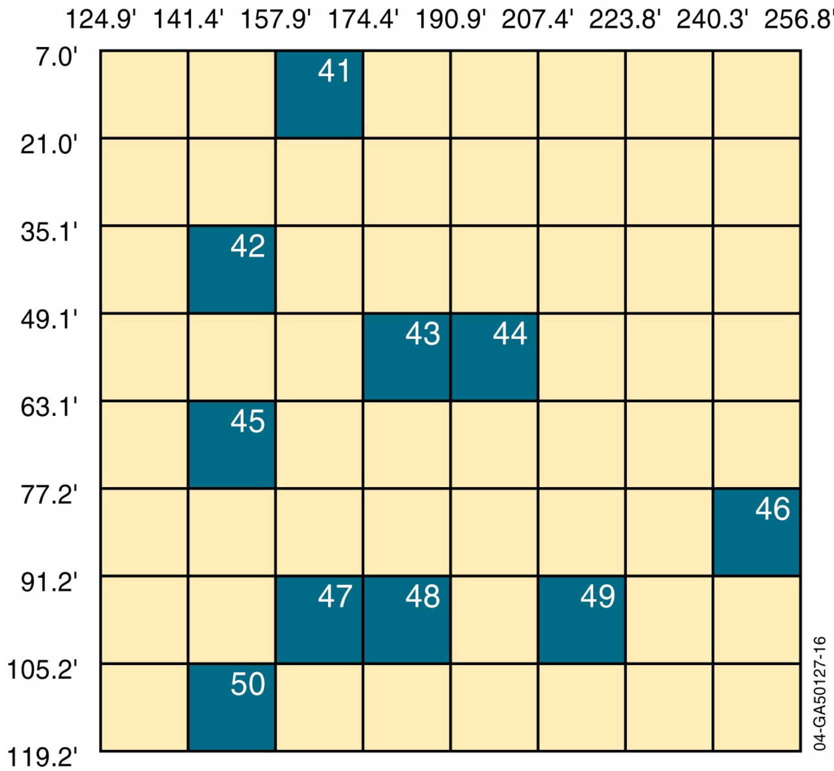

Figure 9. Random selection of cubical volumes for Phase 2, Layer 2 (4–8ft) of the waste zone.

Table 9. Phase 2, Layer 2 grid center-points.

Random Sample	Feet in x-direction from Northwest Coordinate of Retrieval Area	Feet in y-direction from Northwest Coordinate of Retrieval Area
41	166.2	-14.0
42	149.7	-42.1
43	182.7	-56.1
44	199.2	-56.1
45	149.7	-70.2
46	248.6	-84.2
47	166.2	-98.2
48	182.7	-98.2
49	215.6	-98.2
50	149.7	-112.2

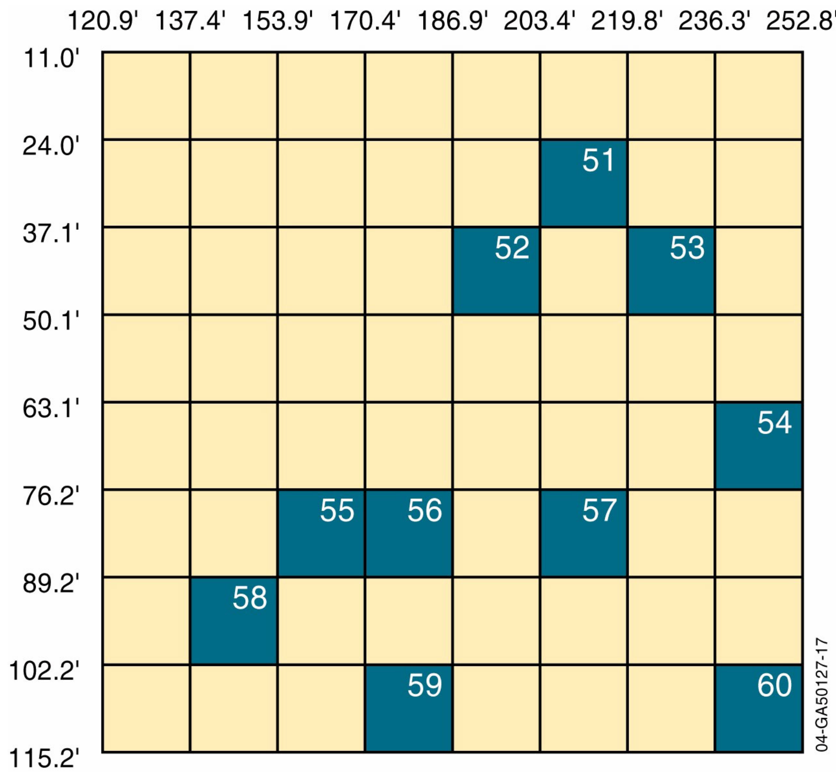

Figure 10. Random selection of cubical volumes for Phase 2, Layer 3 (8–12+ft) of the waste zone.

Table 10. Phase 2, Layer 3 grid center-points.

Random Sample	Feet in x-direction from Northwest Coordinate of Retrieval Area	Feet in y-direction from Northwest Coordinate of Retrieval Area
51	211.6	-30.6
52	195.2	-43.6
53	228.1	-43.6
54	244.6	-69.7
55	162.2	-82.7
56	178.7	-82.7
57	211.6	-82.7
58	145.7	-95.7
59	178.7	-108.7
60	244.6	-108.7

4. SAMPLE DESIGNATION

4.1 Sample Identification Code

A systematic 10-character sample identification (ID) code will be used to uniquely identify samples. Uniqueness is required for maintaining consistency and preventing the same ID code from being assigned to more than one sample.

A sampling and analysis plan (SAP) table and database will be used to record all pertinent information associated with each sample ID code. Issuance and control of sample IDs will be coordinated with the Integrated Environmental Data Management System technical leader of Sample and Analysis Management.

The NTW sample drum identifications and detailed description of the waste will be recorded on a sample data form. The SAP table discussed in this section applies only to the planned underburden samples.

4.2 Sampling and Analysis Plan Table and Database

4.2.1 General

A SAP table format was developed to simplify the presentation of the sampling scheme for project personnel. The following subsections describe the information recorded in the SAP table and database presented in Appendix A.

4.2.2 Sample Description Fields

The sample description fields contain information about individual sample characteristics.

4.2.2.1 Sampling Activity. The sampling activity field contains the first six characters of the assigned sample number. The sample number in its entirety will be used to link information from other sources (e.g., field data and analytical data) to the information in the SAP table for data reporting, sample tracking, and completeness reporting. The analytical laboratory will also use the sample number to track and report analytical results.

4.2.2.2 Sample Type. Data in the sample type field will be selected from the following:

REG = Regular sample

QC = Quality control sample.

4.2.2.3 Sample Matrix. Data in the sample matrix field will be selected from the following:

SOIL = Underburden soil

WASTE = Waste zone material.

4.2.2.4 Collection Type. Data in the collection type field will be selected from the following:

GRAB = Grab

RANDM = Random

DUP = Duplicate.

4.2.2.5 Planned Date. This date is related to the planned sample collection start date.

4.2.3 Sample Location Fields

This group of fields pinpoints the location for the sample in three-dimensional space, starting with the general area, narrowing the focus to a grid location geographically, and then specifying the depth in the depth field when applicable.

4.2.3.1 Area. This field identifies the general sample-collection area (e.g., RWMC – PIT4).

4.2.3.2 Location. This field may contain geographical coordinates, building numbers, or other location identifying details. Data in this field will normally be subordinated to the area field. The location of the underburden sample collected will be recorded using the x, y, z coordinates. The z-coordinate will be collected using the depth monitor within the excavator cab.

4.2.3.3 Type of Location. This field supplies descriptive information concerning the sample location.

4.2.3.4 Depth. The depth of a sample location is the distance in feet from the surface level or a range in feet from the surface. Depth field will be represented as TBD (to be determined) and will be captured during sample retrieval (measured using the depth monitor within the excavator cab). The depth monitor on the excavator corresponds to the depth below the surface of excavation on which the excavator is riding. The depth monitor indicates the depth below the tracks and since the excavator will be sitting on 0.3 to 0.6 m (1 to 2 ft) of potentially contaminated soil, the depth monitor will indicate the depth into the waste plus the thickness of potentially contaminated soil.

4.2.4 Analysis Types

4.2.4.1 AT1 through AT20. These fields contain analysis code designations. Specific descriptions for these analysis codes are provided at the bottom of the SAP table.

5. SAMPLING EQUIPMENT AND PROCEDURES

This section describes the sampling procedures and equipment the project will use to collect project samples. The following sections include guidance on sample collection. A specially colored tray liner will be used for all sample collection activities. Daily work orders will identify the sampling to be performed. The orders and communication with the operators at the DPS will be used to identify whether the cart is designated for NTW, WZM, or underburden sampling.

5.1 Quality Assurance and Quality Control Samples

The NTW sample drums collected during excavation will be assayed using the CCP TRU assay system.

The INEEL Sample and Analysis Management will issue a task order scope of work for established laboratories to analyze underburden soil samples described by this plan, and data from the analyses will be considered definitive. All internal laboratory QA/QC procedures will be followed in accordance with the appropriate laboratory statements of work prepared for this project. Table 1-5 of the QAPjP describes generally recommended field quality assurance sampling, including the items described in the following subsections.

5.1.1 Duplicates

For this sampling project, no duplicate NTW and underburden samples will be collected. Sampling of NTW is being performed to collect data on the average activity present, and the standard deviation of the mean will indicate field variability. Underburden sample collection is meant to provide information on potentially mobile OU 7-13/14 radiological COCs that are not considered present in the WZM and measurement of the field precision is not an objective.

Duplicate WZM samples will be collected at the frequency prescribed in the QAPjP. Table 1-5 of the QAPjP recommends collecting the duplicate samples at a frequency of 5%. This collection frequency is represented in the SAP tables contained in Appendix A. Duplicates will be collected in the same manner as the regular sample with which they are being collected.

5.1.2 Field Blanks

The QAPjP recommends collection of field blanks for subsurface soils collected for radionuclide analyses. Field blanks will not be collected as part of this investigation because it will be physically impractical or impossible for operations personnel to pour analyte-free water into a sample container at the sample collection site inside the RE. Cross-contamination of uranium and VOCs from the excavator bucket to the underburden sample may occur if uranium oxides and Series 743 sludge are encountered in the waste zone before collection of the underburden sample. Sampling equipment used during sample collection (e.g., scoops and spoons) are single-use items.

The QAPjP does not recommend collection of field blanks for the waste zone matrices to be analyzed for PCBs.

5.1.3 Equipment Rinsate Blanks

Equipment rinsate blanks will not be collected as part of this investigation. The excavator bucket will be the field sampling equipment used to collect the WZM or underburden soil. It is recognized that there is a potential for cross contamination for uranium when underburden soil is collected for sampling. It is impractical to attempt to decontaminate the excavator bucket and collect an equipment rinsate each time samples are collected.

5.1.4 Trip Blanks

In accordance with the QAPjP, trip blanks are not required for the analyses and matrices in this FSP.

5.2 Collection of Nontargeted Waste Samples

The sampling process requires the collection of 68 random samples to obtain a representative average TRU activity.

The excavator will collect a scoop of NTW material (i.e., the sample) from a randomly selected location on the return angle of repose. Locations are identified by simple grid markings on the north and west end walls of the RE. The grids are labeled in 4.6-m (15-ft) increments. The depth of the retrieved sample will be measured by the judgment of the operator and the predefined random grid locations in Table 3. The excavator operator will communicate the approximate coordinates and depth of the retrieved scoop to the person responsible for data collection at the DPS. The excavator operator will place the load in a tray for transport to a DPS by the telehandler.

Visual examination for WIPP certification will be performed on retrieved NTW material and WIPP prohibited items will be removed under WIPP certified protocols. A detailed physical description and photographs of the sampled materials that would have otherwise not been retrieved will be recorded by the operator or person responsible for data collection at the DPS. The operator at the DPS or person responsible for data collection at the DPS will collect physical description information before the liner is placed into a drum, and the drum identification for the NTW sample will be recorded.

The drummed NTW samples will be weighed and assayed for compliant CERCLA storage and will undergo nondestructive assay (performed by CCP) in the same manner as the retrieved TW.

5.3 Collection of Underburden Soil Samples

The randomly selected locations for underburden sample collection are identified using the grid markings on the RE walls to identify underburden sample coordinates. The excavator operator will determine which return campaign (exposed swath of underburden) is most centered on the coordinate location.

When visual examination by the excavator operator determines the waste zone/underburden interface has been reached, the operator will use the bucket on the excavator to progressively scrape off 7.6–10.1-cm (3–4-in.) layers until another 0.3 m (1 ft) has been removed in an area larger than the bucket (e.g., 1.2 × 1.2 m [4 × 4 ft]). The possibly intermixed soil will be placed to the side and the operator will remove a scoop of newly exposed underburden. The location of the soil scoop will be communicated to the person responsible for data recording at the DPS. The excavator operator will place the load in a tray for transport to a DPS by the telehandler. The operator at the DPS will collect a grab sample in a 250-mL container from the center of the cartload of underburden soil.

Collection of underburden soil samples and nontargeted waste samples will be performed with the equipment used to perform excavation activities and in an atmosphere with potentially high levels of airborne contamination. When contaminated waste is encountered in the waste zone before collection of underburden or nontargeted waste samples, cross-contamination from the excavator bucket may occur. The project will put procedures in place to attempt to minimize cross-contamination in these samples. However, some cross-contamination in the waste samples is expected by the Agencies. Analysis of collected data must involve consideration of these circumstances.

A summary of relevant information, including the number of samples planned, analyses, proposed methods, and sample container (i.e., collection vessel), appears in Table 11.

Table 11. Sample target and analytical parameters summary information.

Sample Target	Number of Samples (including quality control)	Analytical Method(s)	Analytes or Analyte Groups	Recommended Container (collection vessel)	Preservative	Holding Time
Material that stays in the pit (sampled materials which would have otherwise not been retrieved)	68	100% drum assay will provide TRU characterization	1. Transuranic activity (i.e., Ci) 2. Pu-239 equivalent activity (i.e., PE-Ci) 3. Pu-239 FGE 4. Uranium isotopic masses (U-233, U-234, and U-238) 5. Plutonium isotopic masses (Pu-238, Pu-239, Pu-240, and Pu-242) 6. Am-241 mass 7. Total fissile mass (U-233, U-235, and Pu-239)	Drum	None required	Not applicable to the CCP TRU assay
WZM potentially regulated by TSCA	64	SW-846 Method 8082	PCBs	60-mL widemouth clear glass jar with Teflon-lined lid	Cool, 4ºC.	14 days to extraction, 40 days to analysis for PCBs

Table 11. (continued).

Sample Target	Number of Samples (including quality control)	Analytical Method(s)	Analytes or Analyte Groups	Recommended Container (collection vessel)	Preservative	Holding Time
VOCs and potentially mobile radiological OU 7-13/14 COCs	6	1. Low energy photon spectrometry or equivalent method. 2-4. Liquid scintillation or equivalent counting method. 5. Mass spectrometry, alpha spectroscopy, or other equivalent method 6-7. Alpha spectroscopy or equivalent method. 8. SW-846 Method 8260B	1. Iodine-129 2. Technetium-99 3. Carbon-14 4. Chlorine-36 5. Plutonium isotopes (Pu-238 and Pu-239/240) 6. Neptunium-237 7. Uranium isotopes (U-233/234, U-235/236, U-238) 8. VOCs	1–7. 250-mL widemouth clear glass jar with Teflon lined lid. 8. 60-mL widemouth clear glass jar with Teflon-lined lid.	1–7. None. 8. Cool, 4ºC.	14 days until analysis for VOCs; 180 days from collection until analysis for radiologica l COCs

COCs = contaminants of concern
FGE = fissile gram equivalent
OU = operable unit
PCB = polychlorinated biphenyl
TSCA = Toxic Substances Control Act
VOC = volatile organic compound
WZM = waste zone material

5.4 Collection of Waste Zone Material Samples

5.4.1 Excavation of Cubical Volume

The Plan of the Week (or Day) will identify when a sampling location (identified in Tables 5–10) is being approached. Operations will evaluate the waste zone to determine the material type (e.g., homogeneous solids [inorganic or organic waste forms], soil and gravel, or debris [such as combustibles, metals, and glass]). If there is interstitial soil and sludge with the debris, the waste will be excavated. With the exception of a primarily (greater than 50%) debris area, the waste will be excavated for sampling. If a primarily debris (greater than 50%) area (e.g., a waste box with metals or PPE) is located at the sampling coordinates, an alternate sampling location will be identified using the approach outlined in Section 3.2.3. The excavator shovel will be used to collect material with the x, y, z coordinates given in Tables 5–10. Tolerances on those coordinates are plus or minus 1 m (3 ft) in the horizontal direction and plus or minus 0.6 m (2 ft) in the vertical direction. The material will be placed in a tray and tracked from the excavation site to the repackaging station where sample collection activities will be performed.

A bucket-position monitor will be used in conjunction with suspended markers to document the x, y, z location. The bucket-position monitor provides the horizontal (reach) and vertical (depth, z) displacement of the center of the bucket, while suspended markers provide the location and depth of each sample. Samples are retrieved by touching a suspended marker with the side of the excavator bucket and documenting the horizontal distance from the excavator cab (displayed within the excavator cab on a depth monitor) and the vertical distance from the bottom of the excavator tracks (also displayed within the excavator cab on a depth monitor). The sample volume will be excavated from the appropriate depth, indicated on the marker, while maintaining the same horizontal distance from the excavator cab. Using the bucket position monitor in concert with the suspended markers, the project's sampling data will be correlated with the location of waste in the pit. Operators will keep track of each scoop of waste identified for sampling by recording the scoop location, which will be correlated to the drum number in which the waste will be packaged.

An alternate sample location will be identified with respect to the original coordinates. If the dig is progressing in the east-west direction, the new horizontal distance from the excavator cab to the sample location will be used to determine the sample coordinates. If the dig is progressing in the north-south direction, the alternate sample location will be identified using bucket widths from the original coordinates. Identifying the sample or alternate sample locations will be documented in detail in EDF-4991, "Installation and Use of X-Y-Z Markers for the Accelerated Retrieval Project for a Described Area within Pit 4."

5.4.2 Tray Tracking

The excavated material identified for sampling will be loaded onto a tray for transport to the DPS. A specially colored sampling tray liner will be used to indicate that the material is designated for sampling. Personnel responsible for data collection at the DPS will record the collection location and the date.

5.4.3 Sample Collection from Tray

The sampling approach within the tray will be to obtain samples representative of the tray contents. The tray will be divided into quadrants: 1 is top left; 2 is top right; 3 is bottom left; and 4 is bottom right. The sample will be collected from the center of a randomly selected quadrant. Table 12 identifies the quadrant for each sample given in Tables 5–10.

Table 12. Random quadrant identification for each sample.

Random Sample	Quadrant	Random Sample	Quadrant
1	4	31	1
2	2	32	4
3	3	33	4
4	1	34	3
5	1	35	3
6	4	36	3
7	1	37	3
8	2	38	2
9	3	39	1
10	3	40	1
11	3	41	4
12	3	42	1
13	3	43	3
14	3	44	4
15	4	45	4
16	3	46	1
17	2	47	2
18	3	48	1
19	4	49	3
20	3	50	3
21	4	51	1
22	1	52	2
23	3	53	4
24	3	54	4
25	3	55	2
26	2	56	3
27	3	57	3
28	4	58	3
29	2	59	1
30	3	60	1

The sampling process could include sludge, cemented sludge, or soil. If a solid mass of material (e.g., solidified waste) is encountered, a hammer and chisel may be used for material-size reduction to collect the needed quantity of sample.

6. SAMPLE HANDLING AND ANALYSIS

6.1 Documentation

The sampling coordinator will be responsible for controlling and maintaining all field documents and records and for ensuring that all required documents are submitted to the INEEL Idaho Completion Project Administrative Records and Document Control. All entries will be made in permanent ink. All errors will be corrected by drawing a single line through the error and entering the correct information. All corrections will be initialed and dated.

6.1.1 Drum Information for Nontargeted Waste Drums

The number assigned to the NTW drum and the detailed description of the nontargeted material will be recorded at the DPS on a sample data collection form.

6.1.2 Sample Container Labels for Waste Zone Material and Underburden Soil Samples

Waterproof, gummed labels will display information such as the sample ID number, the name of the project, sample location, and analysis type. In the field, labels will be completed and placed on the containers before sample collection. Information concerning the sample collection date, time, preservative used, field measurements of hazards, and the sampler's initials will be filled out during field sampling activities. MCP-1192, "Chain of Custody and Sample Labeling for ER and D&D&D Projects," establishes the container labeling procedure for this project. The exception to this procedure is that certain information (e.g., collection date and time) may be left off the labels as long as the information is recorded on the chain-of-custody record.

6.1.3 Logbooks

MCP-1194, "Logbook Practices for ER and D&D&D Projects," establishes logbook use and administration procedures for this project. The logbook requirement may be fulfilled by the use of project-specific sample forms. Information pertaining to sampling activities will be entered on the forms. Entries will be dated and signed by the individual making the entry. All forms will have a quality control check for accuracy and completeness.

6.1.4 Data Management

Sample data will be managed in hardcopy format and analytical data will be managed in electronic image format (Portable Document Format). The project may integrate, as practical, currently existing data management systems (e.g., Integrated Environmental Data Management System) for the control of analytical sample information collected to support the project. The NTW drum information will be tracked in the Integrated Waste Tracking System.

6.2 Sample Handling

6.2.1 Sample Preservation

Preservation is not required for the drummed NTW or the underburden soil sample collected for radionuclide analyses. Samples collected for PCB or VOC analysis will be preserved by chilling them once they leave the DPS. During some operations (e.g., fissile material monitor assay), maintaining temperature at 4°C may be difficult. Efforts will be made to maintain sample temperature requirements as close as practicable.

6.2.2 Sample Custody

The chain-of-custody record is a form that serves as a written record of sample handling. When a sample changes custody, the person(s) relinquishing and receiving the sample will sign a chain-of-custody form. Each change of possession will be documented; therefore, a written record that tracks sample handling will be established. The custody procedure for sample collection is established in MCP-1192.

Chain of custody requirements will apply to the WZM and underburden soil samples. The drums of NTW will be identified and segregated from the retrieved TW drums.

6.2.3 Sample Transportation

Project personnel will transport samples in accordance with direction from the packaging and transportation organization.

7. WASTE MANAGEMENT

The waste management approach and practices, waste minimization, waste segregation are described in the *Removal Action Plan for the Accelerated Retrieval Project for a Described Area within Pit 4* (DOE-ID 2004b).

Waste generated from sampling activities is a small subset of the waste being generated and managed by ARP. Waste management activities will be performed in a manner that protects human health and the environment and achieves waste minimization to the extent possible.

7.1 Waste Types and Disposition Logic

Various types of waste will be generated from both sampling and analytical activities. These include:

- Drums of NTW collected for TRU assay
- Sample-collection waste generated within the confines of the DPS
- Unaltered, unused underburden sample
- Unaltered, unused WZM sample
- Analysis residues and miscellaneous laboratory waste.

7.1.1 Waste Types Associated with Nontargeted Waste Samples

Drums of NTW that are collected for TRU assay will be managed as described in the Container Management section in the *Removal Action Plan* (DOE-ID 2004b). The drums will be stored in the ARP CERCLA storage facility or, alternatively in WMF-628. The drummed material may be shipped to WIPP as TRU waste, load-managed with other TRU-waste for shipment to WIPP, or alternately disposed of with other non-TRU (i.e., alpha low-level waste). The DOE will give preference to disposal options that do not involve return to pit (e.g., off-Site treatment and disposal) and will only consider returning waste to the pit that do not present unacceptable risk to the aquifer, subject to agreement with the Idaho Department of Environmental Quality and EPA.

Sample collection waste for the NTW drums includes waste associated with decontamination activities and PPE. These items will be dispositioned as part of the secondary waste related to the retrieving, processing, and packaging of Pit 4 retrieved waste.

7.1.2 Waste Types Associated with Waste Zone Material Samples and Underburden Samples

Waste zone material and underburden sample collection waste includes used disposable sampling tools (e.g., scoops and spatulas), wipes, plastic bags, and gloves that were used in the collection of samples within the DPS. Waste Generator Services (WGS) will manage all waste and will complete a hazardous waste determination in accordance with applicable MCPs.

Analysis residues are expected to contain laboratory reagents in addition to what was in the original sample. Miscellaneous laboratory waste includes glassware, filters, and stirring devices that were potentially contaminated by the sample and laboratory reagents. Altered sample and miscellaneous laboratory waste from this project may be combined. The laboratory reagents may add additional waste codes (i.e., hazardous waste numbers) to the original sample material. Unaltered, unused WZM and underburden sample volume may be managed as low-level mixed waste based on data from the OU 7-10 Glovebox Excavator Method Project. Unaltered unused WZM volume may be managed as mixed TRU waste (potentially TSCA), low-level mixed waste, or low-level radioactive waste.

If the WZM or underburden samples are sent for analysis to an on-Site facility, processing of unaltered and unused sample materials and analysis residues (including absorption of free liquids and proper packaging to support compliant storage) will be supported by the WGS organization at the Test Reactor Area and Central Facilities Area. The laboratory, as the waste generator, will work with the WGS organization to ensure proper identification, coding, and reporting of hazardous constituents in the altered waste. The processed waste will be stored in a satellite accumulation area. WGS will ensure proper disposition or disposal of the material.

If the WZM or underburden samples are sent for analysis to an off-Site facility, the laboratory will dispose of the unused sample volume and the derived sample waste in accordance with ER-SOW-394, "Idaho National Engineering and Environmental Laboratory Sample and Analysis Management Statement of Work for Analytical Services."

Table 13 summarizes the types of waste anticipated to be generated during the sampling effort, the projected waste classification, the estimated waste quantity, and the expected disposition paths.

Table 13. Sampling waste stream disposition path summary.

Expected Waste Stream	Potential Waste Classification	Estimated Volume	Potential Disposition Path
NTW sample-collection waste, including wipes, plastic bags, and PPE, which were used in the collection and processing of samples within the confines of the project (i.e., DPSs and others areas).	Mixed TRU waste, low-level mixed waste, low-level radioactive waste and industrial waste	<1 m^3 (processed with other ARP project waste and not tracked individually)	ARP will disposition these items.
Unaltered unused underburden sample volume	Low-level mixed waste	<1 m^3	Initial processing and packaging is expected to be done at the analytical laboratory. WGS will ensure proper disposition or disposal of the material.
Unaltered unused WZM sample volume	Mixed TRU waste (potentially TSCA), low-level mixed waste, and low-level radioactive waste	<1 m^3	Same as above.

Table 13. (continued).

Expected Waste Stream	Potential Waste Classification	Estimated Volume	Potential Disposition Path
Analysis residues (i.e., altered WZM and underburden material containing residues of laboratory analytical reagents) and contaminated laboratory equipment (e.g., glassware and filters).	Mixed TRU waste (potentially TSCA) These sample residues and other materials may contain chemicals added as part of laboratory analyses.	<1 m^3	Initial processing and packaging is expected to be done at the analytical laboratory and may include absorption of any free liquids. The processed waste is expected to be stored in a satellite accumulation area. WGS will ensure proper disposition or disposal of the material.

ARP = Accelerated Retrieval Project
DPS = drum packaging station
NTW = nontargeted waste
PPE = personal protective equipment
TSCA = Toxic Substances Control Action
WGS = Waste Generator Services
WZM = waste zone material

7.2 Waste Determinations

All waste streams resulting from sampling efforts will be identified, characterized, and managed in accordance with the requirements and processes defined in federal and state regulations; DOE Order 435.1, “Radioactive Waste Management”; DOE Order 5400.5, “Radiation Protection of the Public and the Environment”; the approved waste acceptance criteria for ARP stored waste; and the following company management procedures, as appropriate:

- MCP-62, “Waste Generator Services—Low-Level Waste Management”
- MCP-63, “Waste Generator Services—Industrial Waste Management”
- MCP-69, “Waste Generator Services—Hazardous Waste Management”
- MCP-70, “Mixed Low-Level Waste Management”
- MCP-3472, “Identification and Characterization of Environmentally Regulated Waste”
- ICP-MCP-3475, “Temporary Storage of CERCLA-Generated Waste at the INEEL Site”
- MCP-3480, “Environmental Instructions for Facilities, Materials, and Equipment.”

A hazardous waste determination will be conducted for each waste stream in accordance with the requirements in 40 CFR 262.11, “Hazardous Waste Determination,” to guide proper management of the waste. The determination will also include a TSCA evaluation in accordance with 40 CFR 761, “Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.” These determinations may be documented on INEEL Form 435.39, “INEEL Waste Determination and Disposition Form.”

7.3 Pollution Prevention and Waste Minimization

Pollution prevention and waste minimization techniques have been and will continue to be incorporated into planning and daily work practices to improve work safety and efficiency and to reduce environmental and financial liability.

Examples of practices instituted to support pollution prevention and waste minimization include:

- Implementing a statistical sampling approach that, by minimizing the numbers of samples taken, minimizes the generation of sample-collection waste and reduces the number of NTW drums to be stored and dispositioned.
- Conducting retrieval and sampling activities using remote operations including the use of cameras and windows not only protects the workers, but also reduces personnel entry. This results in a significant reduction in generation of PPE waste.
- Controlling transfer of samples between contaminated zones and clean areas, which minimizes the spread of contamination and generation of new waste.

8. REFERENCES

40 CFR 262, 2002, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 761, 2003, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," *Code of Federal Regulations*, Office of the Federal Register.

15 USC § 2601 et seq., 1976, "Toxic Substances Control Act (TSCA) of 1976," *United States Code*.

42 USC § 2011-2259, 1954, "Atomic Energy Act of 1954," *United States Code*.

42 USC § 6901 et seq., 1976, "Resource Conservation and Recovery Act of 1976 (Solid Waste Disposal Act)," *United States Code.*

42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund)," *United States Code*.

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EG&G, 1985, *A History of the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory,* WM-F1-81-003, Rev. 3, Idaho National Engineering and Environmental Laboratory.

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EPA Method 8260B, 1996, "Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry," Rev. 2, U.S. Environmental Protection Agency.

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ICP-MCP-3475, 2004, "Temporary Storage of CERCLA-Generated Waste at the INEEL Site," Rev. 1, Idaho Completion Project.

ICP-MCP-9439, 2004, "Environmental Sampling Activities at the INEEL," Rev. 0, Idaho Completion Project.

McIlwain, Beth A., 2004, *Data Quality Objectives for the Accelerated Retrieval Project for a Described Area within Pit 4*, ICP/EXT-04-00515, Rev. 0, Idaho Completion Project.

MCP-62, 2004, "Waste Generator Services—Low-Level Waste Management," Rev. 9, Idaho Completion Project.

MCP-63, 2004, "Waste Generator Services—Industrial Waste Management," Rev. 6, Idaho Completion Project.

MCP-69, 2004, "Waste Generator Services—Hazardous Waste Management," Rev. 10, Idaho Completion Project.

MCP-70, 2004, "Mixed Low-Level Waste Management," Rev. 13, Idaho Completion Project.

MCP-1192, 2003, "Chain-of-Custody and Sample Labeling for ER and D&D&D Projects," Rev. 0, Idaho Completion Project.

MCP-1194, 2003, "Logbook Practices for ER and D&D&D Projects," Rev. 1, Idaho Completion Project.

MCP-3472, 1999, "Identification and Characterization of Environmentally Regulated Waste," Rev. 0, Idaho National Engineering and Environmental Laboratory.

MCP-3480, 2004, "Environmental Instructions for Facilities, Processes, Materials, and Equipment," Rev. 9, Idaho Completion Project.

Appendix A

Sampling and Analysis Plan Table

Appendix A

Sampling and Analysis Plan Table

This table contains the following information and is discussed in Section 4.2 of this field sampling plan:

- Sample description fields
- Sample location fields
- Analysis types
- Specific analysis code designations.

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: ARP_UNDERBURDEN

DRAFT

SAP Number: ICP/EXT-04-00516

Date: 12/06/2004 Plan Table Revision: 4 Project: ACCELERATED RETRIEVAL PROJ. FOR DESC. AREA WITHIN PIT 4 Project Manager: SCHAFFER J. M. SMO Contact: MCILWAIN, B. A.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										3A	PC	VA																	
ARPU01	REG	SOIL	GRAB	RANDM	12/01/2004	RWMC-PIT4	UNDERBURDEN	GRID	TBD	1		1																	
ARPU02	REG	SOIL	GRAB	RANDM	12/01/2004	RWMC-PIT4	UNDERBURDEN	GRID	TBD	1		1																	
ARPU03	REG	SOIL	GRAB	RANDM	12/01/2004	RWMC-PIT4	UNDERBURDEN	GRID	TBD	1		1																	
ARPU04	REG	SOIL	GRAB	RANDM	12/01/2004	RWMC-PIT4	UNDERBURDEN	GRID	TBD	1		1																	
ARPU05	REG	SOIL	GRAB	RANDM	12/01/2004	RWMC-PIT4	UNDERBURDEN	GRID	TBD	1		1																	
ARPU06	REG	SOIL	GRAB	RANDM	12/01/2004	RWMC-PIT4	UNDERBURDEN	GRID	TBD	1		1																	
ARPW01	REG/QC	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		2																		
ARPW02	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW03	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW04	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW05	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW06	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW07	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW08	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW09	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Analysis Suite #1
AT2: PCBs
AT3: VOCs (TAL)
AT4:
AT5:
AT6:
AT7:
AT8:
AT9:
AT10:

AT11:
AT12:
AT13:
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:
Nontargeted waste samples are drums and will be tracked by drum number by the project.

Analysis Suites:
Analysis Suite #1: Cl-36, C-14, Tc-99, Np-237, Pu-Iso, U-Iso, Iodine-129

Contingencies:

Plan Table Number: ARP_UNDERBURDEN

DRAFT

SAP Number: ICP/EXT-04-00516

Date: 12/06/2004 Plan Table Revision: 4 Project: ACCELERATED RETRIEVAL PROJ. FOR DESC. AREA WITHIN PIT 4 Project Manager: SCHAFFER J. M. SMO Contact: MCILWAIN, B. A.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1 3A	AT2 PC	AT3 VA	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
ARPW10	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW11	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW12	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW13	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW14	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW15	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW16	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW17	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW18	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW19	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW20	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW21	REG/QC	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		2																		
ARPW22	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW23	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW24	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Analysis Suite #1
AT2: PCBs
AT3: VOCs (TAL)
AT4:
AT5:
AT6:
AT7:
AT8:
AT9:
AT10:

AT11:
AT12:
AT13:
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:
Nontargeted waste samples are drums and will be tracked by drum number by the project.

Analysis Suites:
Analysis Suite #1: Cl-36, C-14, Tc-99, Np-237, Pu-Iso, U-Iso, Iodine-129

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: ARP_UNDERBURDEN

DRAFT

SAP Number: ICP/EXT-04-00516

Date: 12/06/2004 Plan Table Revision: 4 Project: ACCELERATED RETRIEVAL PROJ. FOR DESC. AREA WITHIN PIT 4 Project Manager: SCHAFFER J. M. SMO Contact: MCILWAIN, B. A.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	3A	PC	VA																	
ARPW25	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW26	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW27	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW28	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW29	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW30	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 1ST QTR AC	TBD		1																		
ARPW31	REG/QC	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		2																		
ARPW32	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW33	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW34	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW35	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW36	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW37	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW38	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW39	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Analysis Suite #1
AT2: PCBs
AT3: VOCs (TAL)
AT4:
AT5:
AT6:
AT7:
AT8:
AT9:
AT10:

AT11:
AT12:
AT13:
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:
Nontargeted waste samples are drums and will be tracked by drum number by the project.

Analysis Suites:
Analysis Suite #1: Cl-36, C-14, Tc-99, Np-237, Pu-Iso, U-Iso, Iodine-129

Contingencies:

Plan Table Number: ARP_UNDERBURDEN

DRAFT

SAP Number: ICP/EXT-04-00516

Date: 12/06/2004 Plan Table Revision: 4 Project: ACCELERATED RETRIEVAL PROJ. FOR DESC. AREA WITHIN PIT 4 Project Manager: SCHAFFER J. M. SMO Contact: MCILWAIN, B. A.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										3A	PC	VA																	
ARPW40	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW41	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW42	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW43	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW44	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW45	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW46	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW47	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW48	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW49	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW50	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW51	REG/QC	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		2																		
ARPW52	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW53	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW54	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		

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Analysis Suite #1: Cl-36, C-14, Tc-99, Np-237, Pu-Iso, U-Iso, Iodine-129

Contingencies:

Plan Table Number: ARP_UNDERBURDEN

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Date: 12/06/2004 Plan Table Revision: 4 Project: ACCELERATED RETRIEVAL PROJ. FOR DESC. AREA WITHIN PIT 4 Project Manager: SCHAFFER J. M. SMO Contact: MCILWAIN, B. A.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
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										3A	PC	VA																	
ARPW55	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW56	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW57	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW58	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW59	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		
ARPW60	REG	WASTE	GRAB	RANDM	12/01/2004	RWMC - PIT 4	WASTE ZONE	GRID 2ND QTR AC	TBD		1																		

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Contingencies: